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RISK FACTORS AND RELATIVE RISK

A fundamental tool in the investigation ~~part of the process of defining~~ risk is epidemiology. Epidemiology is a branch of medical science that investigates the presence or absence of statistical associations between particular factors and disease. If a significant statistical association is observed, the factor under investigation is said to be a "risk factor" for a particular disease.

Specifically, an epidemiologist may be interested in identifying risk factors for lung cancer. In one type of study, called a prospective study, he will identify in the population a group of people for study - one well-known study that reported on the association between smoking and lung cancer, for example, used British doctors as the study group. The epidemiologist will then, at regular intervals over a period of ~~anything up to 20~~ years, administer a questionnaire which requests the group to report on their behaviour, occupation, lifestyle, dietary habits, smoking and alcohol intake etc. over the course of their lives. The epidemiologist will then wait to see which of the members of his study group die from lung cancer, and will look back over the questionnaires to see what behaviors, exposures etc. made the lung cancer cases ~~did that made them~~ different from those who did not develop lung cancer. The aim is to identify differences between the two groups in the factors such as those listed above.

If the people in the study who develop lung cancer are more likely to be smokers than nonsmokers, where "likely" is determined by epidemiological computations, then smoking can be said to be statistically assocated with lung cancer i.e. smokers are statistically more likely to develop lung cancer than nonsmokers. Smoking is therefore ~~likely to be~~ identified in that study as a risk factor for lung cancer.

The most important thing to understand about "risk" in this context is that it is not synonymous with "cause." Risk factors are really "risk markers" i.e. they are associated with an altered ~~probability of~~ increased likelihood developing a disease rather than being necessarily causally related to it. The knowledge of risk factors rarely provides any elucidation of the mechanisms ~~or causes of a~~ disease causation; at best, it can provide an indication of where to look for a possible cause.

Epidemiological studies do not only attempt to identify risk factors, but to indicate the level of risk represented by exposure to those factors. They do this by calculating a figure called a "relative risk ratio" (sometimes called an "odds ratio"). For example: if, in the group of people ~~who had lung cancer,~~ in a study of the kind described above, the lung cancer death rate was 10/1000 in the smokers and the lung cancer death rate was 1/1000 in the nonsmokers, the relative risk ratio would be 10/1000 divided by 1/1000 or 10.

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~~there were ten times more smokers than nonsmokers, then clearly, in that study, smokers were ten times more likely to develop lung cancer than nonsmokers.~~ This figure of 10 is what is known as the relative risk factor. A relative risk factor of 2.5 in another such study would mean that smokers in that study were 2.5 times more likely to develop lung cancer than nonsmokers, and so on.

for smokers to develop lung cancer

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